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18 October 1978

TRANSLATIONS ON TELECOMMUNICATIONS POLICY,  
RESEARCH AND DEVELOPMENT

No. 56

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WORLD

WIDE

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WORLDWIDE AFFAIRS

MONGOLIA-USSR RADIO RELAY AGREEMENT SIGNED

OW300404Y Ulaanbaatar MONTSAME in Russian 1835 GMT 28 Aug 78 OW

[Text] Ulaanbaatar, 28 Aug (MONTSAME)--A general agreement on the construction of a radio relay line between Dashinchilen and Erdenet (central Mongolia) was signed here today by the [Soviet] "Prommasheksport" All-Union Export and Import Association and the Mongolian "Kompleksimport" association.

The new line, which will be built jointly by Mongolian and Soviet construction workers, will soon link the mining city with the republic's capital. As a result Erdenet residents will be able to receive central radio broadcasting and television programs and view programs carried over the "Orbita" system. The agreement was signed for the Mongolian side by D. Dorjpalam, chairman of the Mongolian "Kompleksimport" association, and for the Soviet side by V.A. Sidelnikov, acting economic counselor at the USSR Embassy in the MPR.

The signing of the document was attended by D. Saldan, chairman of the MPR State Committee for Foreign Economic Relations and minister of the MPR; D. Gotob, MPR minister of communications; S. Purebjab, chairman of the State Information, Radio and Television Committee of the MPR Council of Ministers; and other officials.

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## WORLDWIDE AFFAIRS

FORMER USIA HEAD ADDRESSES COMMUNICATIONS INSTITUTE

LD121950Y Moscow TASS in English 1705 GMT 12 Sep 78 LD

[Text] New York, September 12, TASS--Speaking at the conference of the International Institute of Communications, which opened in Belgrade, the former United States Information Agency (USIA) director, Leonard H. Mark, according to the UPI agency, called on capitalist countries to launch a special communications satellite, which would help developing nations to better receive Western radio and TV broadcasts. He also urged to lower rates for leading Western newspapers and magazines to make them more available for the population in developing countries.

Leonard Marks is pretending that he cares for the interests of developing states. In fact, the essence of his proposals is that capitalist states should create conditions for intensifying the propaganda of the Western way of life and imposing Western ideology on developing countries.

But is well known that just as USIA in the past, the U.S. Agency for International Communication, which replaced it, is trying to describe the interference of Washington's propaganda machine in internal affairs of young sovereign states as an expansion of information exchange. While doing so, they like to talk in Washington that this is based on the Final Act of the Helsinki conference, though this document contains a provision that "the participating states shall refrain from any intervention, direct or indirect, individual or collective, in the internal or external affairs falling within the domestic jurisdiction of another participating state."

By his talks on improving the means of communications, Leonard Mark will not succeed in camouflaging the essence of Washington's propaganda course, which runs counter to genuine interests of developing countries.

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## WORLDWIDE AFFAIRS

### BRIEFS

ARD-PRC SIGN AGREEMENT--Peking--A delegation of ARD [FRG consortium of broadcasting corporations] led by its deputy chairman, Werner Hess, in Peking has agreed to conclude a cooperation treaty with the Chinese state radio and television commission. The treaty provides for the exchange of television news and films as well as tapes for radio. In addition, ARD is offering assistance to the Chinese in training technicians. [Text] [Hamburg DPA in German 1111 GMT 27 Sep 78 LD]

GDR, MADAGASCAR SIGN ACCORD--Rudolf Schulze and Rakotovao Andriantiana, ministers of posts and telecommunications of the GDR and the Democratic Republic of Madagascar respectively, on 30 August in Berlin signed a government agreement on postal and telecommunications cooperation. It contains provisions to expand relations in the communications field and to deepen scientific-technical cooperation. During his visit, the minister informed himself about the state of development in various sectors of the GDR postal and telecommunications system. [Text] [East Berlin ADN International Service in German 1826 GMT 30 Aug 78 LD]

INTERNATIONAL TELECOMMUNICATION CONGRESS OPENS--Budapest, August 29 (MTI)--A four-day international telecommunication conference began Tuesday morning at the Telecommunication Research Institute of Budapest. Jointly organized by the International Union of Radio Science [IURS] and the Hungarian Academy of Sciences, the session is being attended by some 350 experts from England, Australia, Belgium, Bulgaria, Czechoslovakia, the United States, Egypt, Finland, France, Greece, the Netherlands, India, Ireland, Iraq, Iran, Israel, Japan, Yugoslavia, Canada, Cuba, Poland, Libya, the German Democratic Republic, the Federal Republic of Germany, Norway, Italy, Romania, Switzerland, Sweden, the Soviet Union and Turkey. These include Professor Stumpers, who is represented IURS [as received] and Soviet Academician V. Y. Siforov. Some 230 lectures--including 50 by Hungarian researchers--are to be delivered at the meeting. These will range from theoretical and practical planning of telecommunication to radio systems. Papers will be read also on the application of computers for planning circuits, production and micro-wave components and circuits and telecommunication measurement technics. [Text] [Budapest MTI in English 1025 GMT 29 Aug 78 LD]

ROK RECEIVES CALLS FROM USSR--Seoul, 1 Sep--Telephone contacts have been established between South Korea and the Soviet Union for the first time since the founding of the republic in 1948. Telephone calls were made for 11 minutes beginning 8:44 pm Thursday and 16 minutes beginning 6:34 am today between MBC, a local commercial TV and radio station, and a Korean contingent now in Leningrad to compete in a semi-final round of the world women's volleyball championship. Japan's Kokusai Denshin Denwa Co. made the relay. In the absence of diplomatic ties between the two countries, the Soviet Union had simply ignored phone calls from Seoul. [Text] [Seoul HAPTONG in English 0259 GMT 1 Sep 78 SK]

SINGAPORE-CONGO TELEX SERVICE--The telecommunications authority of Singapore announces that international telex service with Congo will be introduced from 16 August. This expansion brings the number of countries with which Singapore has telex service to 170. [Text] [Singapore Domestic Service in English 2330 GMT 14 Aug 78 BK]

COMPUTER COMMUNICATIONS CONFERENCE--Kyoto, 26 Sep--The world's experts on electronics Tuesday opened a four-day conference to discuss the future of computer communications and their social impacts. The Fourth International Computer Communications Conference, under way at Kyoto International Conference Hall, is the first to be held in Asia. The conference, first held in the United States in 1972, is held every two years. In the Kyoto session, some 930 experts from 27 countries are taking part. On the agenda are computer networks and international standards, applications of light or satellite communications, international distribution of information and their political and social impacts. Yasusada Kitahara, vice-president of the Nippon Telegraph and Telephone Public Corporation, made an opening speech. [Text] [Tokyo KYODO in English 0805 GMT 26 Sep 78 OW]

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## INTER-ASIAN AFFAIRS

### BRIEFS

CUBA-COLOMBIA DIRECT TELEX LINK--Bogota, 25 Sep (AFP)--Colombian Ambassador to Cuba Clara Nieto de Ponce de Leon announced here today that Colombia and Cuba will reestablish telephone and telex communications. A Colombian-Cuban technical commission set up for this purpose will establish conditions under which the reconnection of communication lines will be made. The diplomat also said Colombia and Cuba will strengthen diplomatic relations and are preparing to sign mutual cooperation agreements in the technical, commercial, educational and artistic fields. [Excerpt] [Paris AFP in Spanish 1453 GMT 25 Sep 78 PA]

INDONESIA-SRV RADIO-TV EXCHANGE--The visiting Vietnam radio-television delegation was received by the Information Department secretary general, Sutikno Lukitodisastro, in his capacity as acting radio-television-film director general. The delegation leader, Mr Tran Lam, expressed the wish for cooperation in the exchange of radio and television programs to enable the two nations to learn about each other's culture and situation. [Text] [Jakarta Domestic Service in Indonesian 1200 GMT 13 Sep 78 BK]

THAILAND, VIETNAM SIGN PACT--Hanoi, 10 Sep (VNA)--Premier Pham Van Dong of the Socialist Republic of Vietnam and General Kriangsak Chamanan, prime minister of the Kingdom of Thailand, this morning signed a joint statement, reports VNA's special correspondent in Bangkok. The signing ceremony was held solemnly at the government guest house in the capital of Thailand. Also this morning an agreement on post and telecommunication services was signed in Bangkok by Vietnamese Minister of Foreign Trade Dang Viet Chau and Thai Foreign Minister Uppadit Pachariyangkun. Members of the delegation to the talks between the two countries were present on the occasion. [Text] [Hanoi VNA in English 1619 GMT 10 Sep 78 OW]

VIETNAM JOINS ASIAN BROADCASTING INSTITUTE--Hanoi, 13 Sep (VNA)--The Asia-Pacific Institute for Broadcasting and Television Development has admitted the Vietnam Radio and Television Commission [VNRTC] as a member. Present at the admission ceremony in Kuala Lumpur on September 7 were Abdullah Mohamed, president of the managerial council of the institute,

and Vietnamese Ambassador to Malaysia Vu Bach Mai. Tran Lam, chairman of the VNRTC, signed documents officially recognizing the VNRTC's membership. On September 9 the VNRTC delegation called on the Malaysian broadcasting and television organization and was warmly welcomed by Abdullah Mohamed and other senior officials. The Vietnamese delegates and their hosts had an exchange of views on cooperation between the organizations and on the exchange of programs, experience and correspondents. In the afternoon of the same day the Vietnamese delegation left for Indonesia, continuing its friendship tour of Southeast Asia. [Text] [Hanoi VNA in English 1545 GMT 13 Sep 78 BK]

VIETNAM-INDIAN RADIO, TV PROTOCOL--Hanoi, 30 Aug (VNA)--A protocol on radio and television cooperation was signed on August 28 in New Delhi between Vietnam and India. Signatories were Tran Lam, head of a delegation of the Vietnam Radio and Television Commission on a visit to India, and Lal Kishinchand Advani, minister of information and broadcasting. At the reception given to the Vietnamese delegation after the signing, Minister Advani expressed his desire to see the constant enhancement of cooperation, particularly in the field of broadcasting and television, between the two countries. He said the Vietnamese people, with their patriotism, courage and endurance, as was manifested during the past war against foreign aggression, will succeed in national reconstruction. The Vietnam radio and television delegation left New Delhi yesterday after a five-day visit to India. [Text] [Hanoi VNA in English 1553 GMT 30 Aug 78 OW]

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INDIA

BRIEFS

SATELLITE FOR FLOOD FORECASTING--New Delhi, Sep 25 (PTI)--The Indian satellite for earth observations, which will be in orbit this year, will be used to conduct an experiment in flood forecasting data collection, says a press release. The flood forecasting organisation will use the data collection platforms at Patna, Delhi and Ahmedabad. At Patna, for example, the Ganges level will be recorded on water level sensors which are being built in India. The satellite will transmit it to a central place. The forecasting organisation has planned to participate in INSAT-I, which would provide facilities for communication, TV and meteorological observations. This would help in collection of data from remote areas. A programme to procure micro-computers to analyse data and formulate forecasts is also being implemented. [Text] [Bombay PTI in English 0938 GMT 25 Sep 78 BK]

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## INDONESIA

### BRIEFS

SMALL EARTH SATELLITE STATIONS--The state-owned telecommunications corporation is currently building 10 small earth satellite stations which eventually will be fully integrated with the existing 40 earth satellite stations. The 10 stations are located in Gorontalo, Luwuk, Tual, Endeh, Nabire, Wamena, Tarempa, Tanjungpandan, Gunung Sitoli and Natuna, according to the ANTARA news agency. [Jakarta SUARA KARYA in Indonesian 14 Sep 78 p 3 BK]

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## MALAYSIA

### BRIEFS

COLOR TELEVISION TRANSMISSIONS--Radio and Television Malaysia has begun its 2-phase color television transmission test. Under the first phase, color television programs are shown from 1400 [0630 GMT] until normal television transmission hours begin. The second phase will begin on 1 November. It constitutes supplementary transmission tests beginning after the close of the normal transmission. [Kuala Lumpur Domestic Service in English 1130 GMT 2 Sep 78 BK]

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## MONGOLIA

### BRIEFS

TELEPHONE EXCHANGES--Ulaanbaatar, 8 Sep--Extensive work is underway to reequip communications organizations with modern automatic and semiautomatic equipment and to construct new communications complexes in aymag capitals. One of the first 1,000-number automatic telephone exchanges was put into operation this year under with this program. Next year it is planned to construct and commission an automatic telephone exchange in Olgiy city in western Mongolia and install in it CSSR-made equipment. The expansion of communications organizations and construction of new automatic telephone exchanges in aymag capitals will be completed by the end of the next 5 year plan period. [Ulaanbaatar MONTSAME in Russian 1913 GMT 8 Sep 78 OW]

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PEOPLE'S REPUBLIC OF CHINA

'KWANGMING DAILY' DESCRIBES SHANTUNG'S NEW MICROWAVE LINES

Peking KWANGMING DAILY in Chinese 14 Sep 78 p 2 HK

[KWANGMING DAILY report: "The First Set of Microwave Communication Trunk Lines Completed in Shantung Province"]

[Text] According to a TACHUNG DAILY report, the first set of 960-channel microwave communication trunk lines in Shantung Province was recently completed in triumph and became operational.

Microwave transmission uses very short electromagnetic waves to transmit signals to distant places through relay stations set up about 50 kilometers apart. Its huge capacity, multichannel circuits and ability to counter electromagnetic jamming make it a modern means of radio communication. The set of microwave communication trunk lines completed in Shantung Province is capable of transmitting 960 telephone calls or transmitting single-channel television in color or in black and white. Television signals picked up via the microwave communication lines have good picture and sound. Microwave circuits can also be used to reproduce newspaper mats through high-speed facsimile transmission.

Construction of this set of communication lines, which are linked with those of Shihchia-chuang in Hopei Province, began in 1972. When construction work was in progress, the staff and workers of the Shantung Provincial Postal and Telecommunications Bureau closely bore in mind the important instructions issued by great leader Chairman Mao and esteemed and beloved Premier Chou with regard to accelerating the construction of microwave transmission facilities. By continually eliminating the interference and sabotage of the "gang of four," they succeeded in insuring the smooth progress of the project. After the "gang of four" was crushed, wise leader Chairman Hua wrote an inscription for the role played by postal and telecommunications workers, which aroused their revolutionary drive and quickened the pace of building the project. A major circuit of the microwave transmitter was completed and activated half a year ahead of schedule. The cadres and workers of station 251 used indigenous methods to install a projectile-shaped microwave transmission antenna. Defying the elements, the workers and technicians of station 253 finished painting in the engine room 18 days ahead of schedule. These efforts created favorable conditions for speedily installing the engines and advancing the completion of the entire project. Over 20 units dealing with communications, hydroelectrical power generation, building and designing as well as army units offered vigorous support before the project was completed.

The Shantung Provincial Postal and Telecommunication Bureau recently held a big rally to hail the completion and operation of this set of microwave communication trunk lines.

SRI LANKA

PRESIDENT FILLS TELECOMMUNICATIONS PORTFOLIO

BK141341Y Hong Kong AFP in English 1319 GMT 14 Sep 78 BK

[Text] Colombo, Sep 14 (AFP)--President J.R. Jayewardene today completed his cabinet formation following the promulgation of a new constitution last week.

Two new ministers, three other ministers outside cabinet rank and 23 deputy ministers were sworn in by the president at his official residence at Kandy, 115 km (72 miles), from here this morning.

The former speaker, Mr Anandatissa de Alwis, 29, took his oath as minister of state in charge of information, broadcasting and aviation.

Mr Jayewardene had nominated Mr de Alwis to this post when he named his 27-member cabinet on September 7, the day on which the new constitution was promulgated, but Mr de Alwis did not take oaths on that day with the other ministers. He resigned from the speaker's post yesterday.

Mr. D. B. Wijetunga, minister of power and highways, was today given the additional portfolio of posts and telecommunications.

This followed the death last Saturday of the former minister of posts and telecommunications, Mr Shelton Jayasinghe.

A new speaker will be elected when Parliament next meets on September 21.

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EAST GERMANY

BRIEFS

BERLIN SYMPOSIUM DISCUSSES MASS MEDIA--Berlin, September 25, TASS--A symposium devoted to the task of the mass media at the present stage of struggle for the economic independence, social and cultural progress of developing countries, opened here today. It is timed to coincide with the 15th anniversary of the opening of a school of solidarity under the GDR Union of Journalists. The symposium is attended by journalists from 11 countries, including representatives of the African National Congress of South Africa, the Zimbabwe Patriotic Front and of several international organisations. [Text] [Moscow TASS in English 1607 GMT 25 Sep 78 LD]

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YUGOSLAVIA

NEW REGULATIONS ON RADIO TRANSMITTERS IN SFRY NOTED

LD131744Y Belgrade TANJUG Domestic Service in Serbo-Croatian 0251 GMT 13 Sep 78 LD

[Text] Belgrade--The new regulation on the modalities and conditions under which radio transmitters can be imported into and exported from our country has just come into force.

A foreigner may import into Yugoslavia a portable radio transmitter, a transmitter used for reporting sport competitions or an amateur radio transmitter only if he previously obtained a permit from the Federal Radio Communications Administration. If a radio telephone is involved, a permit from the Yugoslav GOP must have been obtained before the equipment can be brought into our country and incorporated into our system of communications. A foreigner may bring into our country a ship radio transmitter built in a yacht or a boat provided he has the ship log of his country in which the radio transmitter is recorded.

Foreigners must apply for a permit to work their radio stations directly to the Federal Radio Communications Administration or through our diplomatic and consular missions.

If on entry into our country, the foreigner reports that he is bringing in a radio transmitter for which no permit has been obtained, the officer in charge will either seal it or accept it in bond at the request of its owner.

An SFRY citizen who brings a radio transmitter into our country must report the fact at the border crossing to the appropriate internal affairs officer and show the permit allowing him to set it up, or the permission to use it, obtained from the relevant organs.

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## INTER-AMERICAN AFFAIRS

### BRIEFS

VENEZUELAN WORKERS TO BOYCOTT NICARAGUAN TRAFFIC--Caracas, 18 Sep (VENPRES)--Milton Carrero, president of the Federation of Venezuelan Communications Workers, announced that at 0700 on Wednesday the federation will begin an indefinite boycott of telecommunications with Nicaragua. The boycott, he explained, covers mail, telephone, radiotelegraph, telegraph and Telex services and ships coming to Venezuelan ports. This boycott, Carrero pointed out, is indefinite, until the dictator is ousted. Carrero said that as a result of the boycott there will be no communications between Nicaragua and Venezuela. We want to apologize for the measure, but it is a form of pressure to cooperate with the Nicaraguan people's rebellion against the dictator Somoza. He said the federation supports President Carlos Andres Perez' policy in asking for intervention by the OAS in order to apply sanctions against the Nicaraguan dictatorship. [Text] [Caracas Diplomatic Information Service in Spanish 1734 GMT 19 Sep 78 PA]

COMMUNICATIONS AGENCY CUT OFF--Panama, 14 Sep (ACAN-EFE)--The Nicaraguan Government this afternoon cut off international communications with the CENTRAL AMERICAN NEWS AGENCY (ACAN-EFE) and, apparently, also with other press agencies. The ACAN-EFE circuits between Managua and San Jose, Costa Rica, as well as those between Managua and Tegucigalpa, were cut off in midafternoon without prior warning. The cut also affects this agency's communications between the northern and southern parts of Central America. [Text] [Panama City ACAN in Spanish 0004 GMT 15 Sep 78 PA]

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ARGENTINA

BRIEFS

COLOR TELEVISION IN 1980--Buenos Aires, 15 Sep (AFP)--Color television will begin in Argentina early in 1980, it was reported in Buenos Aires today. The FRG PAL system will be used. [Paris AFP in Spanish 1123 GMT 15 Sep 78 PY]

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## BOLIVIA

### BRIEFS

MICROWAVE NETWORK EXPANSION--The National Telecommunications Company (ENTEL) has reported that the microwave network expansion to Tarija, Potosi and Sucre will be in operation around the middle of 1980, since work is being carried out on schedule. An automatic telephone system between these three cities will be put in operation at the same time. The microwave equipment will be provided by General Electric of England. It was also reported that the international traffic center and the Tiwanacu satellite communications station may be dedicated in December of this year. [La Paz PRESENCIA in Spanish 17 Sep 78 p 12 PY]

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BRAZIL

# UNDERWATER OVERSEAS CABLE TO BE LAID

Cable, Linking South America, Africa, Europe

Rio de Janeiro O GLOBO in Portuguese 1 Sep 78 p 27

/Text/ EMBRATEL /Brazilian Telecommunications Company/ is to sign an agreement in Rome on the 5th with the governments of Italy, Portugal, France, Senegal, Ivory Coast, and Argentina for laying an underwater cable linking the telecommunications systems of Europe, Africa, and South America, with about 5000 circuits; the project has been budgeted at \$100 million.

The first section of the project will run between Recife and Dakar, with a cable extending 3,240 km; the second one will extend between Dakar and Lagos, on the African coast, over a distance of 2,952 km, both of them running across the Atlantic. The work will be finished during the first half of 1983 and all of the circuits, once in operation, primarily involving telephones and telex, will double the international communications capacity presently used by those countries in the Intelsat satellites.

Underwater cables offer various advantages as a means of international communication, according to EMBRATEL president Haroldo Correa de Mattos, who will sign the agreement in Brazil's name: "They offer security and quality in transmissions; there is no need for maintenance; they can have a big circuit capacity and, in spite of the high construction cost, the investment pays for itself in less than 3 years of operation; besides, the cable has a useful life of 20 years, against only 5 for the satellites."

With 1,800 circuits between Brazil and Africa, the first section of the project will feature majority participation by EMBRATEL which may vary from 42 to 50%, depending upon the share to be sold to Argentina. The second section will have 300 circuits and this participation will be between 21 and 27%, likewise depending upon negotiations with Argentina. Out of the total number of circuits for the exclusive use of EMBRETEL, 80% will be set aside for traffic with Europe and 20% for traffic with Africa.



### Foreign Ministry Announces Agreement

Rio de Janeiro O GLOBO in Portuguese 16 Sep 78 p 6

/Text/ Brasilia (O GLOBO). Itamaraty /Foreign Office/ announced yesterday that a new underwater cable telecommunications system is to be established by 1982, linking South America, Africa, and Europe, according to an agreement signed in this respect early in the month in Rome by representatives of Argentina, Brazil, France, Italy, Portugal, and Senegal. France will be almost completely responsible for the entire project, from supplying the cables all the way to laying them on the bed of the Atlantic Ocean. Nothing was said about the cost of the undertaking for each country but the total has been estimated at \$300 million. The system will consist of two sections, with more than 4,000 telephone circuits. The section between Brazil and Senegal will have 1,840 circuits and the section going to Portugal will have 2,580 circuits.

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## BRAZIL

### ERICSSON TO APPEAL BIDDING DISQUALIFICATION

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 13 Sep 78 p 25

/Text/ The chairman of the board of LM Ericsson, Bjorn Lundwal, informed communications minister Euclides Quandt de Oliveira that he would appeal through administrative channels against the decision disqualifying his enterprise from competitive bidding for the manufacture, in the country, of CPA (stored-program-controlled) telephone exchanges.

Bjorn Lundwal did not provide any explanations on the grounds for the appeal. On leaving the office of Minister Quandt de Oliveira, he did not wish to give an interview, claiming "lack of time and other tight deadline commitments."

According to reports from the Ministry of Communications, the administrative appeal could be forwarded to the minister responsible for the disqualification decision or to the president of the republic.

Bjorn Lundwal spent about 45 minutes with Minister Quandt de Oliveira and the only matter taken up was competition for the manufacture of the CPA /system/. The meeting was also attended by Ericsson general manager for Brazil, Valdemar Henriksson, and Antonio Carlos Almeida Braga, director of Atlantica Boa-Vista, an Ericsson partnership group involved in the competition.

The president of LM Ericsson came to Brazil in order tomorrow, in Sao Paulo, to chair the special enterprise meeting at which time the disqualification of Ericsson of Brazil from competition for the production of the CPA system and its effects on company business will be analyzed.

#### One Explanation

Accompanied by Almeida Braga and former minister Juracy Magalhaes, the Ericsson president went to see Minister Calmon de Sa to whom he expressed his concern over the damage to the company's image resulting from its disqualification from competitive bidding for the supply of the CPA system. In his capacity as chairman of the consultative board of Ericsson, Juracy Magalhaes said that the enterprise feels that the explanations given by communications minister Quandt de Oliveira for the disqualification are insufficient. "We are investigating in an effort to find out what is happening because we have

not yet been officially informed. We want details. So far we have gotten only a short, three-line communique, the same that was released to the press," said Juracy Magalhaes.

Calmon de Sa clarified his position on the competitive bidding: the opinion of the Superintendency of private insurance, against the association of Atlantica with Ericsson, will not be reconsidered, he said. Legislation prohibits an insurance company from using more than 20% of its capital outside the insurance field.

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BRAZIL

DIRECT DIALING SYSTEM TO BE EXPANDED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 15 Sep 78 p 16

/Text/ The goal of EMBRATEL /Brazilian Telecommunications Company/ in the intercity service field for 1978 is the adaptation of direct long-distance dialling in 4.2 million telephones, covering 802 cities throughout the country. This disclosure was made yesterday, in Rio, by EMBRATEL president Haroldo Correa de Mattos, in revealing the program for the 13th anniversary of the enterprise which will be celebrated today with a mass at the Church of Candelaria in Rio.

He justified the rapid expansion of the direct long-distance dialling network (which in 1977 covered only 470 localities) in the light of a requirement for "handling the vast volume of intercity traffic processed daily by EMBRATEL systems." He explained that, during the first half of this year alone, the number of intercity connections exceeded 100 millions, with a growth rate of 21 percent over the first half of 1977.

Telephone

"Where we have our own domestic technology, it is being used completely, because we are interested in developing a technology of our own. We are providing incentives not only through work but also with money in order to push research in Brazil; this is why we already have our own Brazilian telephone, completely developed by Brazilian enterprises, now being tested on a large scale." These explanations were provided yesterday at Campo Grande by Communications Minister Euclides Quandt de Oliveira who was in the city to preside over the ceremonies inaugurating the new telephone exchange with an initial capacity for 15 /sic/ phone units.

The day before yesterday, Quandt de Oliveira in Brasilia pointed up the financial problems faced by radio and television stations as the main cause for the rather weak position of these vehicles of Brazilian traditions and culture. According to him, one of the basic objectives of the telecommunications bill is precisely to work out mechanisms that will provide incentives for the rise of a genuinely Brazilian television system.

The day before yesterday, Quandt de Oliveira defended the absence of prior censorship over radio and television programs, "including debates, reports, and scientific or general programs."

## CHILE

### BRIEFS

NEW COMMUNICATIONS POLICY--A new national telecommunication policy will be approved within a few weeks, followed by a general telecommunications law. Telecommunications Under Secretary (Fernando Fernandez) said that two factors led to the new law: 1) the present law has been rendered obsolete by technological developments, and 2) the present structure must be reorganized to fit the national economic policy. (Fernandez) said the objective of the new policy is to provide the new telecommunications law with a philosophical framework providing guarantees for all citizens, such as free access to the media. This law guarantees great freedom of access to radio and television broadcasting so that these media can reach every Chilean under the best technical conditions possible and thereby guarantee freedom of information. The law contains many regulations to prevent the formation of either private or state monopolies. [Santiago Chile Domestic Service in Spanish 1100 GMT 26 Sep 78 PY]

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CSO: 5500

## INTER-ARAB AFFAIRS

### BRIEFS

BROADCASTING UNION MEETING--Riyadh--The General Assembly of the Arab States Broadcasting Union [ASBU] concluded its meetings this evening at King Faysal Conference Hall, Riyadh. The meetings, which lasted for 3 days, were chaired by Salih Bin Nasir, assistant under secretary of the Ministry of Information for Radio and Television and chairman of the confederation. The recommendations and resolutions of the ASBU General Assembly include the formation of a financial committee comprising representatives of the kingdom [of Saudi Arabia], Syria and Sudan to audit the final account for the year 1976-77. The assembly approved the acceptance of Djibouti as an active member of ASBU and the Irish Radio and Television Corporation as an affiliated member. The assembly recommended that the ASBU coordinate with the PLO with regard to the programs beamed to the occupied territories. [Excerpts] [Riyadh SNA in Arabic 1835 GMT 26 Sep 78 LD]

CSO: 4802

## ZAMBIA

### BRIEFS

MICROWAVE LINK--President Kaunda said in Kasama today that effective communication links with neighboring countries were very essential to landlocked Zambia's all-round development. The president was speaking when he commissioned the Lusaka-Kasama-Likonde microwave link. On the local theme, Dr Kaunda said the microwave link will improve important circuit facilities for the Northern Province for telephones, Telex and telegram services as well as a television channel earlier restricted to areas [words indistinct]. Dr Kaunda also disclosed that the Post and Telecommunications Corporation is embarking on improving and modernizing existing facilities and building exchanges. [Salisbury Domestic Service in English 1115 GMT 21 Sep 78 LD/CA]

CSO: 5500

## TREATY ON MASS MEDIA NEEDED TO HALT WEST'S SUBVERSION

LD202346Y Moscow TASS in English 1742 GMT 20 Sep 78 LD

[Text] Moscow, September 20, TASS--"Human intellect has created mass information media not for kindling hatred, not for building up tensions and not for ideological acts of sabotage, but so that they should serve the cause of peace and mutual understanding of peoples," the NEW TIMES [NOVOYE VREMYA] notes. In an article on the question of dissemination and exchange of information, the weekly writes: "Is it possible to draw up such generally acceptable standards, principles of international information activity that would take into account the interests of states with different social systems, guarantee the use of mass information media for peace, deepening detente and mutual understanding, and not hatred among nations?"

"An overwhelming majority of states believe that it is not only possible, but also necessary. And necessary precisely now that restructuring is under way of the whole complex of international relations along the lines of peaceful coexistence and international detente." The NEW TIMES notes that the Soviet Union is consistently pursuing the line so that at talks in international organizations were developed step by step and coordinated just principles meeting the requirements of peaceful coexistence and documents outlining the content and form of information exchanges.

The weekly stresses that exceptionally important work has been done in this respect at the Conference on European Security and Cooperation and recalls that at the Belgrade meeting the delegations of the socialist countries tabled proposals on broadening cooperation between news agencies, on preventing propaganda of militarism, racialism, putting an end to psychological warfare practices, on enhancing the responsibility of newsmen and information media for the objectiveness of their news coverage.

"Regrettably, all of these proposals have been rejected by representatives of the NATO member countries. Moreover, the U.S. delegation openly took under its protection the actions of such subversive radio stations as Liberty and Free Europe, which were specially created for acts of sabotage against striving of the United States to preserve a free hand for further propaganda falsifications, for ideological subversive activity."

The NEW TIMES goes on to write that UNESCO is now discussing an important document--a draft declaration on basic principles of use of mass information media for strengthening peace and international mutual understanding, for combatting war propaganda, racialism and apartheid. The initiative of the draft was put forward by the socialist states, and it was practically drawn up by experts of many countries. It must be believed that the debate to be held late in October in Paris at the next session of the UNESCO General Conference on this issue will be useful and will end in the adoption of a declaration, the weekly writes in conclusion.

CSO: 5500



USSR

BRIEFS

KRUTOGOROVO TV RELAY STATION--A television relay station has been installed in Krutogorovo, making it possible for its residents to be the first in Sobelevskiy Rayon, Kamchatskaya Oblast, to view Orbita-2 programs. [Vladivostok Maritime Service in Russian to the Pacific Far East 1930 GMT 22 Sep 78 OW]

CSO: 5500

## INTERNATIONAL AFFAIRS

### OPERATIONAL, EXPERIMENTAL EUROPEAN SATELLITE COMMUNICATIONS SYSTEMS, PROGRAMS

Rome NOTE, RECENSIONI, NOTIZIE in Italian Sep-Dec 77 pp 225-245

[Article by Engineer G. Pagliai]

[Text] 1. The ECS (European Communication System) Program

The ECS program is an operational program, designed to satisfy the needs of the administration of CEPT [European Postal and Telecommunications Conference] and UER [European Union of Radiobroadcasting] members beginning in the year 1980 or thereafter.

The system's objective is to channel intra-European telephone, telegraph and telex traffic through a space link, as well as to insure television transmission of Eurovision programs. It can have additional functions such as data transmission, teleconferences, as well as supply telephone links with oil towers in the North Sea and more.

Information gathered on telephone traffic formulated with the collaboration of all the Post Office Administrations indicates that in the first years of the next decade the circuits activated on the space repeater will not number less than 5,000 and represent a large part of the ever increasing volume of traffic.

The total for 1990 will increase to 20,000. The increase in traffic follows the trend outlined in Figure 1.

The most important earth stations in relation to the activation of circuits via satellite are, in order of importance:

- 1) London
- 2) Zurich
- 3) Stockholm
- 4) Rome, Madrid, Frankfurt
- 5) Paris, Milan
- 6) Brussels, Amsterdam, Copenhagen, Athens, Vienna, Belgrade

- 7) Lisbon, Barcellona, Oslo
- 8) Hamburg, Helsinki, Ankara
- 9) The Azores, Madeira

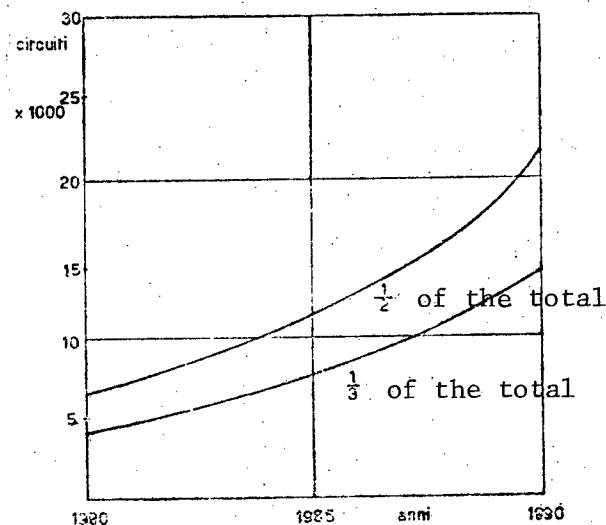


Figure 1

With regard to television programs, in October 1974 UER presented a technical-economic based study to CCTS [Committee for Satellite Telecommunication Coordination], a part of CEPT, dealing with the transmission of Eurovision programs via satellite making mention of three types of channels:

- a) the first, immediately available without prior notice to the Post Office administrations, required 2 channels in 1980 and 3 in 1990;
- b) the second, available on 1 hour notice based on previous agreement with the administrations, 3 channels in 1980, 4 in 1990 (usage of 5 percent of total time);
- c) the third, with prior notice of several days and in cooperation with CEPT, called for 4 channels at the beginning of the decade and 5 by its end (usage of 1 percent of total time).

Each channel was designed to simultaneously carry:

- a) a color TV SECAM/PAL signal;
- b) a high quality sound signal coupled to each television image;
- c) twenty signals for audio dialog;

d) other channels, for the control of TV services and for commentators. Some of these circuits (TF bidirectional between principal station and earth stations) were to have been available on the basis of multiple access, while others available with telegraphic call and response capability first with 50 baud and later with 200 baud.

Naturally, by such a proposal, UER did not intend to parcel Eurovision traffic out between the satellite and conventional nets. The definitive agreement with CEPT called for the setting aside of two wide band repeaters capable of assuring high quality transmissions between the European ground stations for TF and TV traffic and for those limited to television traffic for North Africa and the Middle East.<sup>1</sup>

By way of note, we would like to say that for satellite radio emissions, that SBAG (Satellite Broadcasting Advisory Group), a part of ESA, has already reached agreement with UER with regard to an additional satellite, whose launch is planned by the end of 1980 and will also use the L04 (the fourth) of Ariane. It will most probably operate on a frequency between 13.9 and 15 GHz<sup>2</sup> and as potential beneficiaries of its television experiences it will have two radio transmission units which would time share the use of the space repeater. In 1977 ESA had signed study contracts with European industry for research (mentioned above) of a satellite which will, in a stationary orbit, have a weight of 900 kilograms. The space vehicle will be a forerunner of a large platform capable in the future of carrying several valuable loads for the direct and semidirect transmission of TV programs and for radio sound transmission in addition to 20/30 GHz propagation packets. In the future a total of 4 TV channels is foreseen, high-power channels for the direct reception by the users and the retransmission to earth on the part of radio transmission authorities whose prior reception was done with minimally extended terminals.

From a constructive point of view, the ECS satellite, already being built, uses transmission "chains" of the type used by A Module of the OTS, of which more will be said later, due to the positive results achieved during the period of orbital trials. The carrier structure is the same.

From the management point of view, the preoperational trials undertaken with the experimental satellite will confirm the soundness of the system plan or will call for modifications.

The maximum lifespan expected of the ECS satellites is 7 years. To assure the existence of a space link, that is to say the availability of a connection for the planned period of 10 years, it is necessary to have at least two satellites in orbit, one of which is on "stand by" immediately available and a whole series of others on the ground ready to be launched.

The frequencies to be used for the ECS have been chosen by CEPT from among those available according to Section 1, WARC [World Administrative Radio Conference--in Italian CAMR], specifically:

ascent tract	14.00-14.50 GHz
descent tract	10.95-11.25 GHz
	11.45-11.70 GHz

Because of the number of TF and TV circuits to be emitted in the linking, the 500 MHz band necessitates the reuse of crossed polarized frequency.

The choices today of the planned systems will indicate the following coverages:

1st zone:	European
2nd zone:	Atlantic
3rd zone:	Western Europe
4th zone:	Eastern Europe

The satellite shall have a synchronous equatorial orbit located at 10°E longitude. Only Europe is covered by a global beam while the others are covered with a spot beam (see Figure 2).

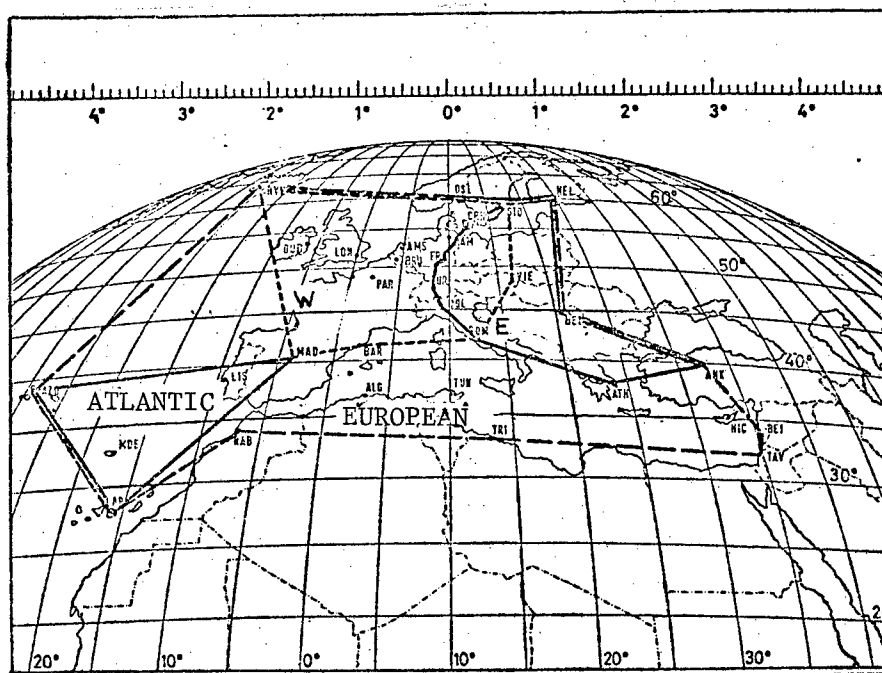


Figure 2

Plans call for the use by the ECS satellite of 12 transponders each having at least an 80 MHz band and, because they are the source of used energy, they can be made to function using the 12-9-5 formula. This means that nine of them can be used for telephony during the time the satellite is not in eclipse, five for when it is in eclipse (using batteries). The remaining transponders serve as reserve.

Minimal Number of Repeaters in Use

Year	TX <sup>m</sup>	RX <sup>m</sup> Atlantic	RX W	RX E	Total
1981 e 1982	2	1	1	1	5
1983	2	1	2	1	6
1984	2	1	3 (2)	1 (2)	7
1985	2	1	4 (3)	1 (2)	8
dal 1986	2	1	5 (4 o 3)	1 (2 o 3)	9

(1) Transmission. (2) Reception.

(\*) Global beam = area of general coverage; spot beam = area of restricted coverage

The two orbiting satellites will have a task and repeaters envisioned as follows:

The administrations which are part of the CEPT have created an organization called EUTELSAT (presently in an interim phase) whose mission is the management of the space sector of the future operational system. This is the organization which will link the ITU [International Telecommunications Union] with UER and INTELSAT with regard to the ECS system.

Also, the sum to be paid by EUTELSAT-INTERIMIAIRE to ESA for the year has been calculated, as of the date the first satellite goes into service. This sum was calculated following a formula which includes several official price indices of the electronics and aerospace industries of several nations beginning on 21 December 1976 and later adjusted for the first day of year of usage.

## 2. The Preoperational Experimental System Which Utilizes OTS [Orbital Testing Satellite] and the Related Program of OPT [Orbital Testing Program]

This telecommunications satellite is experimental and preoperational in character, thus its program can be included in that of ECS.

The ESA [European Space Agency] had planned to launch a satellite toward the middle of 1977. Because of additional trials at ESTEC<sup>3</sup> (Noordwijk) and Toulouse, the date advanced to 14 September 1977.

It is well known that the launch attempt undertaken with the Thor-Delta 3914 booster met with failure.

The OTS, after liftoff, functioned by telemetry for 54 seconds, according to NASA spokesmen, that is, until the explosion of the ninth auxiliary solid propellant engine.

A new launch has been planned using the OTS-B, the reserve unit, 6 months following the failure of the first launch.

### The OTS' Mission

The orbital test satellite will be devoted to experiments programmed by CEPT, UER, European research agencies and universities, in order to acquire a concrete experience for those techniques needed to activate the operational systems, as well as the utilization of these systems. In particular, the OTS will:

- 1) confirm the concept of space vehicle and verify its operation;
- 2) experiment with the 11/14 GHz bands, the results of the technologies activated and numerical transmission with TDMA [Time Division Multiple Access];
- 3) evaluate the incidence of propagation phenomena of E.M. waves through the atmosphere, and the quality of transmission;
- 4) study the technical problems arising from the management of the new system;
- 5) study and experiment, in view of the future possible applicability of satellites, transmission of direct radio diffusions in space;
- 6) evaluate the possibility of data and other information transmission between small scale terminals.

### 3. Description of the Satellite

#### 3.1. Modular Structure

The feasibility studies were begun by ESA (then ESRO--European Space Research Organization) in 1971. OTS is the third European TLC satellite, which was preceded by the Franco-German experimental Symphonie and the Italian Sirio.

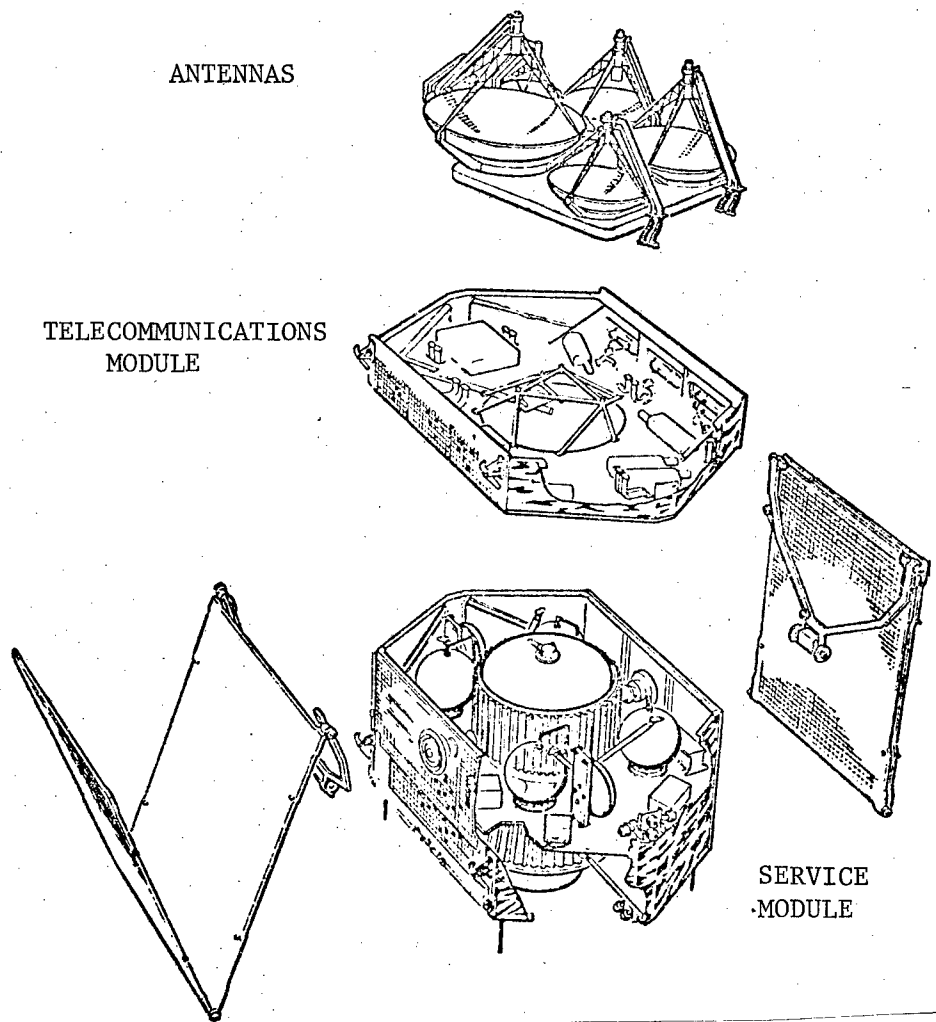


Figure 3

It is a triaxial stabilization satellite and of modular construction configuration (Figure 3). The structure in fact consists of a service module which insures all the essential support functions and a telecommunications module which contains the payload.<sup>4</sup> An antenna control system allows the pointing of the six SHF antennas to within  $0.2^\circ$  for



Returning to the modular structure, additional comments on its capacity shall be mentioned. In general, it allows the satellite to be adapted to several scopes, that is, for diverse types of TLC transmissions. Furthermore, within certain limits, which are considerable, the repeater

allows the introduction of SHF machinery of greater volume and thus of differing capacity so as to be able to satisfy requirements tasked in future years.

The OTS service module weighs 236 kilograms (the structure alone is 42 kilograms); it houses the apogee motor, fuel reserves, inertial wheel (stabilization gyroscopes and the majority of the electronic apparatuses).

### 3.2. Energy Feeding

The foldout solar panels, fixed to two opposite lateral sides (of which the satellite has six) furnish the electric energy for its functioning. It is clear that during the launch and the transfer orbit the panels will be folded in and will cover part of the satellite's surface and there will only be two "faces" which will insure energy input during the initial orbital phases.

For the first phase, the panels will be entirely folded out and pointed toward the sun. Apparatuses for the transfer of electric energy gathered by the solar cells are located on the six "faces" of the hexagonal prism equipped with honeycomb sandwich-panels. It should be remembered that the radiation intensity outside the atmosphere is of 2 Langley (1 Langley = 1 cal/cm<sup>2</sup> min) that is 1.395 kW/m<sup>2</sup>  $\pm$  2% because of the effect of sun spots and  $\pm$  3.5% because of the distance variation between earth and sun (152.10<sup>6</sup> km at the aphelion and 147.10<sup>6</sup> km at the perihelion).

### 3.3. The Launch

The launching into a geostationary orbit of a satellite takes place via a timed sequence of "phases," that is, of preestablished actions which last a total of about 23 days.

The first is that of the launch. The choice of the launcher is predicated first of all on the weight of a vehicle to be put into an orbit of about 36,000 km over the l.d.m. and on the geometric patterns of the final orbit. It is one thing to place a spacecraft in position such as Intelsat IVa with a weight of 730 kilograms of orbit mass and another to launch a satellite of the Anik type weighing only 300 kilograms.

The speed in an equatorial geostationary orbit, with the sub-satellite location on earth almost stationary, can be thought of simply as that of a circular movement which produces a radial acceleration equal and opposite to that of the gravity at that height. But in reality there are serious complications. One of these is the series of corrections to be made to the calculations and technological projects developed in order to find a launch trajectory needed to place a given "range" of payloads in orbit as well as other causes such as the launching point, the launching characteristics, the atmosphere's resistance, the satellite's tendency to tumble out of orbit because of the uneven gravitational pull

given the earth's imperfect spherical shape, the egress speed of the apogee engine gas exhaust and so on. For this reason, OTS was presented with various possibilities for a choice of launchers, as one can gather from what is synthesized in Table 1. The choice was the Thor-Delta 3914 of McDonnell Douglas.

Table 1

Launch vehicle	Origin	Payload in orbit (kg)	Size (m)
Delta 2914 - 3914	USA	340 ÷ 460	2,2
Atlas - Centaur	USA	865	2,9
Titan III - c	USA	3180	3,7

As an item of note, in addition to the above-mentioned launches, one can add the European heavy launcher Ariane, with an initial projected weight of 900 kilograms in orbit. It is still in an experimental phase and plans call for it to be operational by 1980.<sup>5</sup> Also included is the Shuttle (USA) which will put the Spacelab and other items in orbit, which is being prepared by NASA, and capable of placing in a low circular orbit a mass weighing 30 tons.

The launching phase (see Figure 5) begins with the "lift off" and lasts about 25 minutes. Then begins the second phase. In it, the third stage will place the satellite in a "transfer" orbit, a very elliptical one (185 km perigee, and 36,1000 [sic] apogee) and will fasten it to rotate around the yaw axis of 60 RPM (always facing the sun). (Stabilization by rotation.)

Following the separation of the third stage, the OTS satellite shall be maneuvered by radio from the European Space Operations Center (ESOC) at Darmstadt in order to have the axis of revolution of the satellite parallel to the optimal direction for the entry into geosynchronous circular orbit. Only 37 hours after the launch, that is after the fourth apogee bypass, ESOC will be able to decide whether to start the apogee motor the thrust of which will allow the rounding-out of the elliptical orbit.

At this point we could say that, the third phase being completed, the solar panels unfold and the operational life of the satellite begins. But in reality, immediately following the entry into geostationary orbit, there is a transition phase of extreme delicacy which will permit the switching from gyroscopic stabilization to a triaxial one which calls for the reduction of speed of revolution, solar acquisition,<sup>6</sup> and

deployment of panels. Earth acquisition for rotation around the roll and yaw axis, launch of the inertial wheel, maneuvers to bring the satellite to 10°E. Its definite periphery speed will be of 11,060 kph over a circumference of 265,000 kilometers.

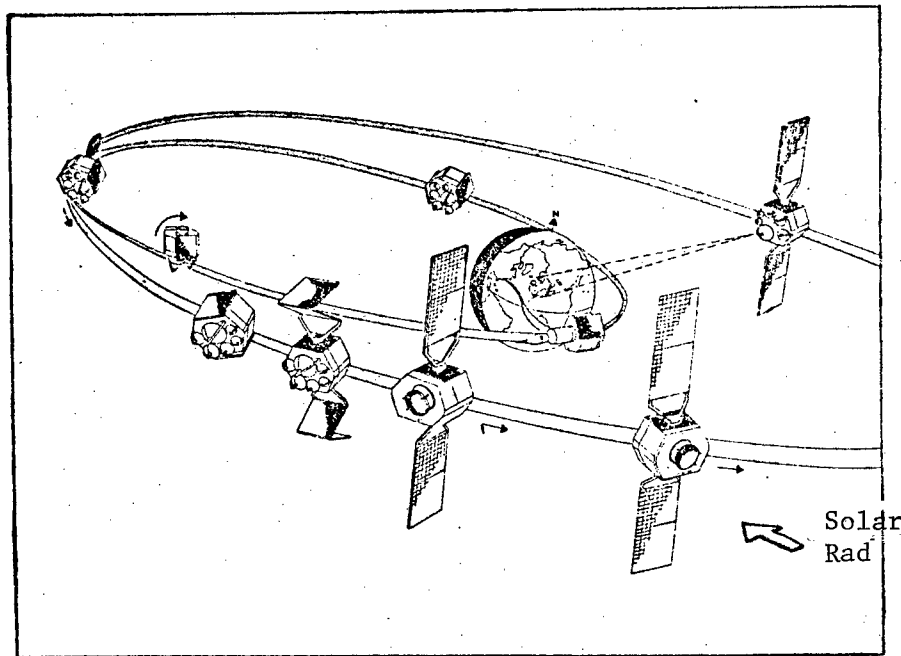


Figure 5

The change from a transfer orbit to a synchronous one is labelled drift orbit and these operations encompass the length in time of the drift phase.

During the launch and during the transfer and draft phases, ESOC will use for its TM&C the following stations:

NASA: Ascension, Orroral, Guam, Santiago, Quito, Merrit Rosman Is.

ESA: Redu (B)

DFVLR (22): Weilheim (D)

CRA (23): Malindi (Kenya)

### 3.4. Summary of OTS Characteristics

--MASS

Launch weight	865 kilograms
Orbit weight	444 kilograms

--DIMENSIONS

Height x length x width	2.39 x 2.13 x 1.68 m <sup>3</sup>
Opening (folded out panels	9.26 m

--POWER

Power available in transfer orbit	90 W
At beginning of satellite life	809 W
At end of 3d year of mission	580 W

--LIFE

Minimal normal span	3 years
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--LAUNCH

Launcher	Thor Delta 3914
Location	Eastern Test Range, Cape Canaveral, Florida

--TRANSFER ORBIT

Apogee	36,100 kilometers
Perigee	185 kilometers
Inclination with respect to equatorial plain	27.38°

--SYNCHRONOUS ORBIT	35,900 km over the equator
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--POSITIONING	10°E longitude $\pm$ 0.10
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OTS CONTRACTS

Main builders

Aeritalia (I)  
Selenia (I)  
Hawker Siddley Dynamics (UK)  
chief contractor for  
Matra (F)

LCT (F)  
Thompson-CFS (F)  
Erno (D)  
TELDIX (D)

Apparatus

--structure  
--ground support apparatus  
--antennas  
  
--power distribution  
--assembly, trials integration, orien-  
tation and orbital correction com-  
mand system  
--TM&C(20) large band and TWT  
--thermal subsystem structures  
--cynetic flywheel  
--cynetic flywheel

### Main builders

AEG-Telefunken (D)  
chief contractor for  
Contraves (CH)  
CIR (CH)  
Holland Signaal Apparaten (NL)  
  
Inta (E)  
Saab (S)  
BTM (B)  
C. Rovsing (DK)

### Apparatus

--payload  
--mechanical ground support  
--electronic ground support  
--cynetic flywheel for AOCS (Attitude  
and Orbit Control of the Satellite)  
--VHF antennas  
--Telemetry and Command  
--Telemetry and Command  
--Telemetry and Command

### 3.5. The Satellite's Subsystems Are the Following:

Repeater  
Antennas  
Structures  
Thermal Control  
Energy Distributor  
Telemetry and Command (TT&C)  
Trim and Orbit Control (AOCS)  
Apogee Boost Motor  
Pyrotechnics  
Instrumentation

Because of the fact that our scope is to refer to telecommunication applications, we shall not describe all the subsystems. We will focus only on the repeater and on the antennas, that is, on the telecommunication payload.

### 3.6. The Payload

Is made up of two modules: A and B.

The A module is a smaller version of that which will be made for ECS and which retains its principal characteristics such as the receiver GIT, transmission energy, earnings and area coverages of the antennas except for modifications made necessary by the OTS' test results.

This module is used for the retransmittal of TF signals in PSK-TDMA and TV signals.

#### 3.6.1. The A Module

The A module contains four apparatus chains as shown in Figure 7. That is, two chains with 40 MHz nominal band and two with a 120 MHz band. Each couple is made in such a way as to allow frequent reuse with orthogonal linear polarization.

Included in the A module are also the satellite's telecommand receivers and the telemetry transmitters.

The receiving antenna system is made up of two identical disks (in redundancy) which look out on the whole of Europe with the Eurobeam A, which at 3 dB measures  $7.5^\circ \times 4.25^\circ$ . The transmitting antenna produces an identical elliptical beam. The ellipticalness is due to the deformation of the outer edges which originally were circular.

There exists also a fourth antenna in the A module which is a radiator used in transmission and related to the two channels which form the chain with the 120 MHz wide band.

It is a paraboloid with a diameter larger than the other two and therefore, using same frequency, with greater benefit. It produces a mobile spot beam with a nominal beam width of  $2.5^\circ$ . The associated mechanism allows it to be pointed where it is needed. The frequencies used are those preselected by the ECS, namely:

Up link	D Band 14.00-14.50 GHz
Down link	A Band 10.95-11.25 GHz
	B Band 11.45-11.70 GHz

The A module, with which we are now occupying ourselves, uses the following frequencies or bands:

TC (Telecommand) receiver	14.125 MHz
40 MHz chain	$14152.5 \div 14192.5$ MHz
120 MHz chain (up-link)	$14242.5 \div 14362.5$ MHz

In the satellite-earth connection:

TM (telemetry) transmitter	11,575.0 MHz
40 MHz chain	$11,490.0 \div 11530.0$ MHz
120 MHz chain (down link)	$11,580.0 \div 11,700.0$ MHz

As seen in Figure 6, it is possible to note that every chain in the A module (four in all) is composed of two sections: one with a large band and another with a limited "channelized" band. The first one mentioned precedes the second according to the route traveled by the signal, that is, from reception to transmission.

The large band section is formed by two reception chains, one active and one stand-by, each doubled up to accommodate both polarizations. The module A repeater channels are connected in such a way as to transmit in an orthogonal linear polarized fashion related as to how they receive.

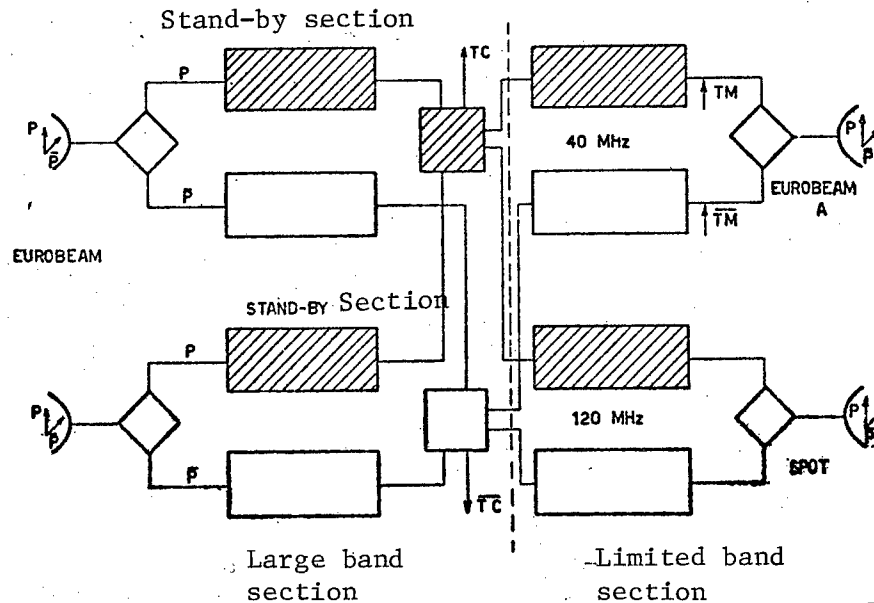


Figure 6

It is obvious that every receiving antenna which picks up crossed electromagnetic camps must feed both its chains, each one reserved for signals of a single polarization; therefore an OMT (ortho-mode-transducer) net is necessary to provide for the division of signals and is therefore placed immediately after the antenna.

Likewise in transmission, with a similar mechanism, the coupling of both orthogonal polarized signals will take place, each exhibiting orthogonal polarization as they were received, that is, capable of simultaneous transmission in both polarizations.

The two sections are thus made up:

a) Each large band contains, in the following order, an entry filter, a low noise parametric amplified, an IF preamplifying connector and an energy combination and division net. The name large band is justified by the fact that the section functions for the whole OTS large 350 MHz frequency band, beginning with 14112.5 MHz to 14462.5 MHz for the RF reception side and from 800 to 1150 MHz for the IF exit side.

The TC telecommand, which can be received in both polarizations, is extracted from the intermediate IF frequency (UHF). The division and combination net calculates the exit of active and redundant reception chains for each polarization.

b) Each limited band section (limited to the channel width) includes an IF filter at the exit of the above-mentioned combiner, an IF principal



The RF obtained with the aid of local oscillators is amplified in TWT (Traveling Wave Tube) with a 20 W exit and finally passes through the filtering agents. All of the elements used except the filters are at least of 250 MHz band. The TWT function with large bands covering frequencies between 10.9 and 11.7 GHz.

One of the 40 MHz channels and a 120 MHz channel in crossed polarization with respect to that of the first, each has access capability to one of the two TWT; the remaining two channels do not have redundant amplifiers.

The TM signals are inserted in the first of the two antennas and emitted in one of the two possible polarizations.

Table 2. A Module General Characteristics

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### 3.6.2. The B Module

[The B Module] consists of two 5 MHz associated repeating chains with two antennas, one for reception and one for transmission both with circular double polarization and both related to the Eurobeam B coverage.

The large band section is similar to that found in A module.

The down converters use the same local 13312.5 MHz oscillator. At an intermediate frequency, the main amplifier is followed by a variable PIN dial attenuator.

During transmission, an up-converter for each chain which uses the same pump source at a 10650.0 MHz frequency, is followed by an adding net for the introduction of 11786.0 MHz frequency beacons<sup>7</sup> which will come before the superior and inferior chain TWT's to be filtered with a principal signal and sent out by the same antenna in two circular polarizations, one left and the other right using an ortho-mode-transducer and polarizers (continuous signals).

The chains' total gains, as happens with A module, are variable upon command, twice as variable as that of A module and with a maximum value which goes above the gain of A chains by 20 dB.

The result of this is that, together with the narrowness of the band used, experiments with the OTS through small terminal grounds are possible.

The functional diagram is shown in Figure 7.

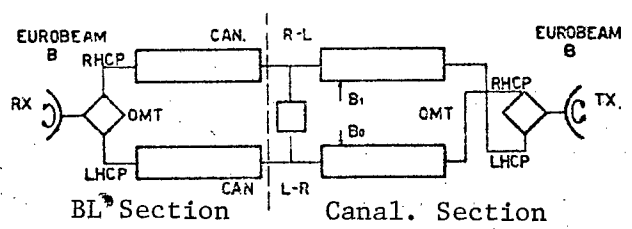
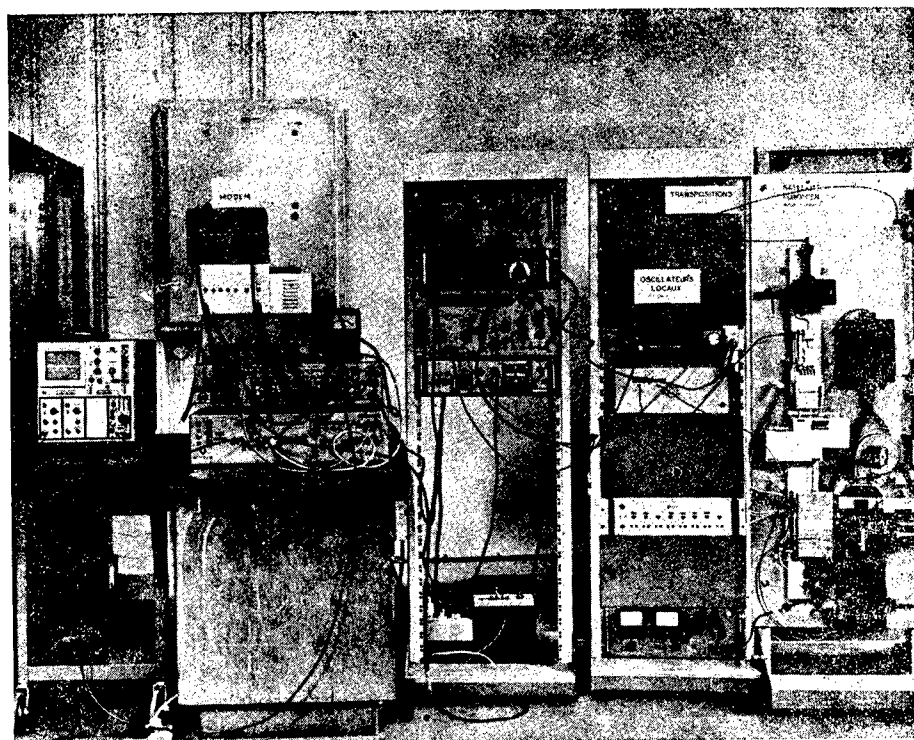


Figure 7

Finally the general characteristics are shown in Table 3.

Table 3. General Characteristics of B Module

Channel indication		RL	LR
Band width	(MHz)	5	5
Noise figure	(dB)	5.0	5.0
Nominal linear gain	(dB)	143.3 ÷ 111.0	143.3 ÷ 111.0
Entry level for saturated exit	(dBW)	-123.1 ÷ 91.1	-123.1 ÷ -91.1
Saturated exit level (at beginning of activation)	(dBW)	11.8	11.5
Antenna gain over Rome (dB)		Eurobeam B 28.7	



First model of OTS transponder used during transmission trials at CNET (Paris, July 1973).

#### FOOTNOTES

1. Mention is made that in addition to those countries which are CEPT members and also UER members, other Mediterranean countries such as Algeria, Israel, Jordan, Lebanon, Morocco, Tunisia and others should be included in this union.

2. At the present there exists a controversy with CEPT over the use of 11.95-11.2 GHz as defined in the World Administrative Conference on Radio Transmission via Satellite (Geneva 1977).
3. ESA's major plants are: European Space Research Technology Center (ESTEC); European Space Operations Center (ESOC); and the European Space Research Institute (ESRIN).
4. That is, the repeater and the antenna. The structure alone weighs 17 kilograms. The whole TLC module weighs 102 kilograms.
5. Recent improvements such as the increase of pressure in the combustion chamber foresee the possibility of launching two satellites simultaneously with a weight of 1900 kilograms.
6. Acquisition of intake position made possible by (angular) measures of the solar diameter.
7. Of interest is the fact that the transmission occurs in an opposite direction from reception with regard to polarization and happens on every channel. For this reason the channels are labelled R-L and L-R (or RHCP and LHCP--right hand circular polarization and left hand circular polarization) and the beacons labelled B and Bo respectively.

9202

CSO: 5500

FRANCE

#### EFFECTS OF TELECOM BUDGET SHRINKAGE DISCUSSED

Paris L'USINE NOUVELLE in French 7 Sep 78 p 40

[Article by Helene Pichenot: "Telecommunications: Plans Confirmed but Budget Is Reduced"]

[Text] To maintain the goal of the Priority Action Plan (15 million subscribers in 1980) despite the substantial reduction in the capital investments budget, economies will be effected in three domains.

As the budgets of the various administrations are being drawn up, the attention of industrialists is focused on the area of telecommunications, which, let us recall, is favored by a Priority Action Plan. The 1979 budget provides for a reduction in capital investments to a total of 24.5 billion francs as compared to 25.5 billion in 1978. The telecommunications industry also fears its orders will diminish at a time when technological changes (from electromechanical to electronic) pose serious employment problems. The prime minister has requested each industrial enterprise to draw up a report on the employment situation in its establishments. Initial responses are pessimistic. Almost half the personnel now employed will be excess in 5 years.

#### Viewpoint of the Industrialists

The General Directorate of Telecommunications is aware of the industry's employment problems. However, it is optimistic regarding its investment plans. According to Director of Telecommunications Gerard Thery, "The budgeted funds should enable us to implement the Priority Action Plan in normal manner. We should have 12 million subscribers by the end of 1978, more than 13.8 million by the end of 1978, and, before the end of 1980, the 15 million subscribers called for by the PAP if our borrowing capability permits." To get around the difficulty posed by the sharp reduction of the capital budget, the Directorate General of Telecommunications has decided to effect economies in three domains. The material stockpiling policy will be fully reviewed and rationalized. The prices of equipment purchased from industry must be further reduced. And lastly, Gerard Thery expects to

realize a 10-percent saving in one of the largest areas of his budget (40 percent of the total): subscriber service connections. The Directorate General of Telecommunications henceforth will adhere to a systematic policy favoring underground cables, which utilize a more economical technology than aerial cable. The disappearance of steel and concrete telephone poles will delight the environmentalists, but to a much lesser extent the manufacturers of this type of material.

9238

CSO: 5500

MOBILE PAGING SYSTEM INITIATED IN SWEDEN

Stockholm TELE in English No 1, 1978 pp 4-7

[Article by Seth Myrby]

[Text]

*The Swedish Telecommunications Administration will start its countrywide paging service, MBS, in the autumn of 1978. The system design has several unique features that have attracted great interest from all parts of the world. The service is cheap. The paging, which can be carried out from any telephone set in Sweden, costs only 2 markings (at present SKr 0.34) a time, irrespective of distance. Each paging call is transmitted simultaneously all over the country. The radio broadcasting transmitters in the FM band are used and thus the paging reaches everywhere where there is good FM reception (practically all Sweden). This gives extremely good coverage for very low investment costs.*

*The telephone number of the caller can either be transmitted direct to the MBS receiver and shown on a small display, or it can be transmitted by announcing machine from the MBS exchange in Örebro in central Sweden. Thus the MBS number can be entered in the telephone directory together with the normal telephone number. This fills a large gap in the paging market and also opens the way for a number of different applications, for example in the field of remote control.*

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## New modulation technique

The work on developing what was then called the MS system started as long ago as the end of the 1960s. Practical field trials with about 200 receivers were carried out in the districts round the Mälaren valley (central Sweden) and the experience gained from these trials later proved to be decisive for the further development of the system.

The system design for this earlier variant was based on transmission of 3 consecutive tones chosen from among 100 in the range around 60 000 Hz. These tones were modulated in on the FM broadcasting transmitters, and in this way the first and basic characteristic of the system was obtained:

- Without any investments worth mentioning, a radio coverage of Sweden is obtained that is almost one hundred per cent and moreover this is achieved without using any more of the limited frequency spectrum.

This double utilization of the FM transmitters caused no problems as long as it was only a question of monophonic or stereophonic transmission in accordance with the Swedish FM-FM compander technique. However, when Sweden decided to use the pilot tone system it soon became clear that the modulation technique used in the MS system had to be changed. This was because of the interference that arose between the third harmonic of the stereo pilot ( $3 \times 19 = 57$  kHz) and the MS tones, which gave rise to faint but perfectly audible tones in radio receivers.

A detailed theoretical and practical study was started in the Administration's Radio Laboratory with a view to determining the optimum modulation technique for transmitting additional information over a FM broadcasting transmitter without causing mutual interference when pilot tone stereo was being transmitted at the same time. The work was successful and led to the birth of the MBS system in a new design; a design which also made possible several essential improvements to the system as a whole.

### Access numbers

The following access numbers are used for the different services:

Service	Access number	
	Paging	Messages
MBS-E	0045	—
MBS-EP	0045	—
MBS-EL	0046	—
MBS-ELP	0046	—
MBS-V	0047	0048
MBS-VL	0047	0049
MBS-N	0047	—

Numbers 0045–46 are only used by those who know the MBS subscriber's fixed rallying point. 0047 is used when the MBS subscriber is to be paged over a wider area and when the MBS number is to be printed in the telephone directory.

The numbers 0048–49 are used only by the mobile paging subscribers when inquiring who have called them.

### The subscriber's costs

Service	Initial fee, SKr	Quarterly subscription fee, SKr	Paging SKr/occasion
MBS-E			
MBS-EL	100	65	0.34
MBS-V			
MBS-VL	100	95	0.34
MBS-N	100	110	0.34
MBS-EP			0.17 per
MBS-ELP	100	380	8 seconds

Checking the "Who has called" information costs SKr 0.17 per 8 seconds.

The subscription charges in the table cover one MBS receiver per subscription. An additional fee of SKr 10 per quarter is charged for each additional receiver.

If several subscriber numbers are requested for one and the same receiver the normal subscription fee is charged for each number.



## A high-class data channel

The new design is basically as follows. A 57 kHz sub-carrier is locked in phase (phase shift  $90^\circ$ ) to the third harmonic of the pilot and is phase modulated with a 1200 baud binary coded signal. In order to reduce the risk of interference further, a symmetrical code (Manchester) has been chosen. Low frequency products, which may cause problems, are thereby suppressed.

This design gives an interference-free method of transmitting data over a stereo modulated FM transmitter. The design is unique and very carefully worked out. It is very close to what must be considered as the optimum solution and it will therefore be proposed for international standardization.

The changeover to the binary coded technique also made possible the use of self-correcting codes that increase the reliability of the signal transmission considerably. A detailed theoretical analysis of the characteristics of various codes was carried out, among other things with regard to the types of disturbances that are common in the FM band and to which the MBS receivers will be exposed. The code finally chosen has very good characteristics in this respect and is able to correct bursts with up to 5-bit faults per block.

Digital signals are particularly suitable for processing in integrated circuits, and thus the changeover from analog signals also provided new possibilities of increasing the signal processing capacity at a low cost. The digital signal is generated in the MBS centre in Örebro and is sent over data transmission lines to the radio stations in three places. From there the signals are transmitted almost simultaneously over all the FM transmitters for P3 (radio program 3) in the country, by using "ball-empfang"-technique. Thus no special distribution circuits are required between the different transmitters, they "listen to" each other. This means that the cost of distributing the signals is very low but it also means an increased risk of degeneration when they have been relayed a number of times. In the new system design, however, this has been prevented by correction and regeneration of the signal at each trans-

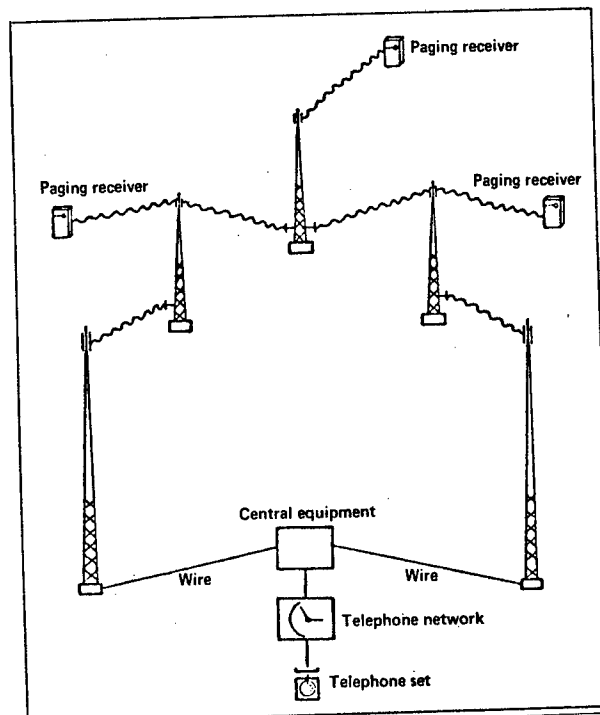
mitter station before retransmission, which considerably reduces the probability of bit errors. Furthermore each transmitter has two alternative reception routes. If a fault occurs in a transmitter the MBS signal is switched to another transmitter. Each of the two feeding points in the three places normally supplies signals to its half of Sweden but can, if necessary, take over the feeding of the whole country alone. A system with high transmission reliability has thereby been obtained at a comparatively low cost. Ball-empfang-receivers

and the regeneration and switching equipment are manufactured in the Administration's own factories. Tel.

## Unique number display

The changeover from MS to MBS has meant an increase in the amount of information that can be trans-

System sketch.



mitted over the radio channel per unit of time. While retaining the capacity of 300 000 subscribers, the telephone number of the calling subscriber can now also be sent direct to the MBS receiver and displayed there. The Swedish international exchanges, with their greater register capacity, are used in order to make possible the transfer of so many digits from the telephone subscriber to Örebro. The previous plans only comprised transmission of the number to the exchange in Örebro, from where an announcing machine could then on request provide information as to who had called. This original solution has been retained, but the developed variant that displays the caller's telephone number in the receiver has given Sweden a paging system which at present seems to be one of the most advanced in the world.

A MBS subscriber with one of the more advanced variants of the service can thus have his MBS number printed by the side of his telephone number in the directory. If nobody answers the telephone the natural thing will be for the caller to try paging via MBS.

## Functional receivers

The receiver is of a robust construction in a convenient pocket size. The operating life of the battery varies

from a few hundred to about a thousand hours depending on the type of battery. The simplest receiver variant gives an acoustic signal when paged. Some receivers can be allocated more than one subscriber number and it can also be arranged that a whole group of receivers are alarmed by the same number.

A mobile radio system is always exposed to disturbances and field strength variations. In order to give a reasonable paging reliability in spite of this, all calls are transmitted twice with an interval of just over half a minute between the two transmissions. The self-correcting code and the possibility of comparing two pagings make it possible for an intelligent receiver to evaluate transmitted signals with a very high degree of reliability. For several reasons, among others in order to save the batteries in the receivers, the receivers have been divided into groups, which are paged in turn. When the particular group to which a receiver belongs is not being paged, several of its functions are disconnected and the current consumption is then very low.

In spite of its small dimensions the sensitivity of the built-in antenna is so great that paging can be received within almost the same areas as those in which satisfactory broadcasting reception is obtained with a portable transistor radio. The paging receiver also contains a monitor that indicates whether the local field strength is high enough for receiving pagings.

The receivers are automatically tuned over the whole FM band. This is done so that the subscribers can go anywhere within the country and yet receive pagings without having to switch to other wavelengths. Thus a sufficiently strong FM transmitter that sends MBS signals is automatically tuned in. In order to differentiate between the Swedish system and MBS systems in adjacent countries, so that locking to an unwanted transmitter does not occur, the code contains a label that is unique for each country.

## Other applications

This inevitably brings to mind other applications outside the field of paging. Program channel labelling is easily accomplished, so that a car radio receiver is always automatically tuned to, for example, P3 regardless of where in Sweden it is. It is also easy to arrange for program labelling so that news reports, traffic information, school broadcasting or other types of programs are preceded by a specific signal that switches on the broadcasting receiver just before such a program. This method opens the way for a general and versatile program labelling system with a large capacity, which is not the case with other similar systems, such as the ARI system.

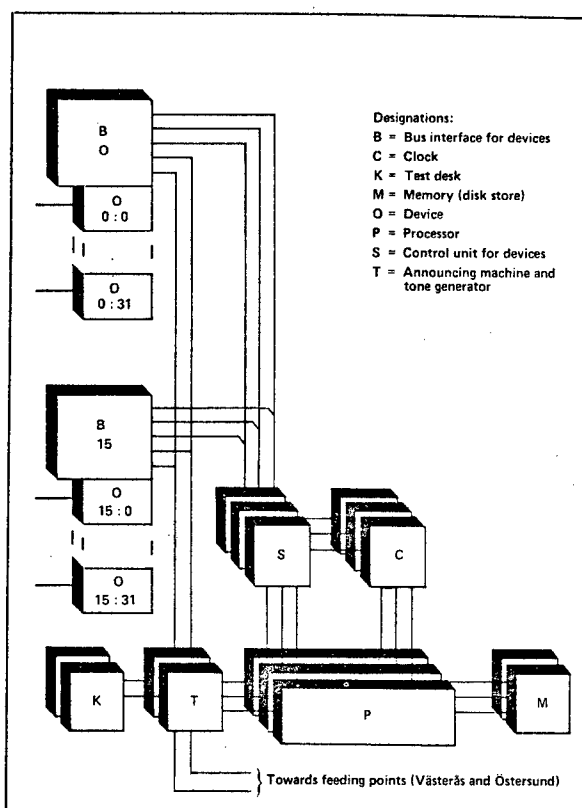
An interesting combination is obtained by supplementing a normal FM broadcasting receiver with the LSI circuit that is the core of the MBS receiver. In this way both functions are obtained at a low cost. More-

over it is likely that indication of the program labelling signal can be obtained with the same circuit, which would give an extremely versatile system at a low cost.

The subscriber number received by the MBS receiver can of course symbolize a control code for remote control purposes. The only requirement is that these digits are accessible in some form at an output in the MBS receiver. This could mean very interesting applications in cases where for example a leased circuit or ordinary telephone subscription would be far too expensive.

## An advanced central equipment

The brain of the system is the central equipment in Örebro, to which all calls are routed. The equipment analyzes the incoming calls to ascertain whether the number is open, the type of subscription with which it is associated etc. All this information is stored in disk stores and the input of the information is carried out by the staff at the sales office in Örebro. The central equipment arranges the pagings in a queue and the appropriate code sequences are generated and transmitted in their final state over two data circuits to FM/TV stations in three places.



Block diagram of the central equipment for mobile paging.

In Örebro the various announcing machine messages and charging signals used are also generated. In addition paging statistics for different subscriber categories and trunk code areas are delivered to the computer terminals connected to the system. These are also used for the output of information concerning any faults in the system.

The equipment was developed by the Swedish Telecommunications Administration and Ellemtel since there was no suitable product available on the market. It is a combination of micro processor technique and wired logic, and is designed so that it can be built out from 30 000 to 300 000 subscribers when necessary. The equipment can also be manufactured and sold by the Administration to interested parties in other countries, and informal contacts have already taken place.

Development work of this type is relatively costly, but if this form had not been chosen it is unlikely that

all the system changes and improvements that were devised during the course of the work would have been introduced as smoothly as has actually happened.

## An exciting market experiment

The Swedish Telecommunications Administration has had very positive experience of the type of marketing used for the subscriber equipment in the manual mobile telephone system MTD, that is to say the subscriber applies to the Administration for a subscription but gets type approved equipment on the private market. Price competition, product development and marketing collaboration are some of the advantages obtained. The MBS receivers will therefore be marketed in the same way. Initially receivers from Sonab and Mitsubishi will be available.

However, there are indications that the Administration's sales sector would benefit from the inclusion of MBS receivers in their product range. Thus the Marketing Department for Telephones has plans to compete with the private market and to sell receivers at the Administration's sales offices in those telecommunication areas that are interested.

## MBS variants for all needs

The MBS service can be offered in several variants. In its simplest form (MBS-E) it gives a beep in the pocket and the paged person must have come to an agreement previously as to what is to be done, for example call the exchange at work or go to the headquarters of the retained fire brigade. In the latter case the supplementary service *legitimation requirement before paging* (MBS-EL) may be of value. It requires that a 3-digit code, which can easily be changed from time to time, is dialled before the paging is carried out, in order to prevent unauthorized alarms. This type of customer probably also requires a *group number*, i.e. several receivers with the same number.

The caller's telephone number can be transmitted by means of storing in the central equipment (MBS-V). Only the simple and cheap type of receiver mentioned above is required. When the called person wants to know who has called he calls up the MBS equipment and dials his MBS number, after which an announcing machine gives the numbers of those who have called during the last few hours. Incidentally, this is an excellent secretary service even without an MBS receiver. In this case also, a legitimation requirement can be introduced so that the announcing machine message cannot be initiated by unauthorized people (MBS-VL).

In the most advanced form of the service the subscriber number can be transmitted direct to the receiver, where it is shown on the receiver display (MBS-N). The number is stored in a memory which can also be given extra capacity to include a couple of the latest pagers. These receivers will cost a few hundred kroner more than the simple version, but on the other hand they open up almost unlimited application possibilities.

Finally there is the service *priority paging*, perhaps supplemented by the legitimation requirement, which gives priority in the paging queue and also repeated paging as long as the caller does not replace the receiver (MBS-EP and MBS-ELP). This service will only be available for essential community needs since it requires considerable system capacity.